

# RESERVE COPY

## PATENT SPECIFICATION

504255

Application Date: Nov. 9, 1937. No. 26991/38.

(Divided out of Application No. 30767/37 [492,182]).

Complete Specification Left: Nov. 4, 1938.

Complete Specification Accepted: April 21, 1939.



### PROVISIONAL SPECIFICATION

#### Improvements in and relating to Cubicles or Apartments for use in Houses, Factories, Tents and other places and Temporary Shelters

We, NEWCON INDUSTRIES LIMITED, a Company organised under the laws of Great Britain, and CHARLES HENRY ADAMS, a British Subject, both of City Gate House, 39/45, Finsbury Square, London, E.C.2, and GUY PASCOE CROWDEN, a British Subject, of "Wolstenholme," Stanmore Park, Stanmore, Middlesex, do hereby declare the nature of this invention to be as follows:—

This invention relates to cubicles or apartments having heat insulating walls consisting of three or more layers of comparatively thin material with air spaces between them the surfaces of one or more of which layers are covered with bright metal foil, for example aluminium foil.

According to the present invention the walls and ceiling of such cubicles are composed of a number of rectangular panels abutting together at their edges and secured together by clips or the like each panel consisting of a frame of metal which in cross-section resembles the letter E with the flanges directed inwards, the sheets of the walls being secured at their edges to these flanges.

The metal strips of E section constituting the framing of the panels may be composed of two strips of channel section placed together, in which case the margins of the middle layer composed for example of thin asbestos or like sheet with aluminium foil secured to both sides by means of bitumen, are placed between the abutting flanges of the two channel section members. In this way the asbestos sheet insulates the two channel sections from one another thereby minimising the transference of heat by conduction through the framing.

The outer sides of the webs of the framing may be formed with dovetail grooves extending longitudinally in which strips of packing material come together and by reason of their resiliency they make an air-tight joint between panels. Alternatively, and especially when the framing is composed of two channel section members placed side by side, the strips of packing material may be merely secured to the

webs by means of screws or rivets.

Preferably, the external layers constituting the walls are composed of laminations of paper or the like impregnated with artificial resin such as that known under the registered trade mark "Bakelite." Alternatively, they may be of impregnated plywood or fibrous wall-board or other suitable material.

The means for holding the panels together edge to edge preferably consist of toggle devices such as are known as trunk fasteners, consisting of a pivoted lever to which is hinged a link or stirrup which can be engaged with a hook, the base-plate carrying the pivots of the lever being on one panel and the hook being mounted on the other panel so that when the lever is turned down flat with the panel the two are drawn firmly together.

Preferably all the wall sections are the same size which may for example be about 7 feet long by 2 feet wide and the door and also the panel containing the window when such is used are made the same size as the remainder of the panels. The roof sections are preferably the same width as the wall sections.

The external layer of some or all of the wall panels which is to be on the inside of the cubicle is formed with an aperture at the bottom preferably covered with mosquito-proof gauze and openings are made in the frame member at the top which register with openings in the external layer of the corresponding roof section. These openings place the inner air space of the wall sections in communication with the inner air space of the roof sections and when the interior of the cubicle is supplied with a stream of air from an air conditioning apparatus the air flows upwards through the inner air spaces of the walls through the inner air spaces of the ceiling and escapes through holes in the middle and outer layers of the roof sections, these holes also being covered with mosquito-proof gauze.

In one embodiment of the invention the E section members are of light aluminium alloy, preferably extruded. The width is

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about  $1\frac{1}{2}$  of an inch and the thickness of the web and the three flanges is about  $\frac{1}{2}$  of an inch. The middle flange is wider than the other two and is so placed that one of its sides is in the centre of the width of the member. The side flanges are set in slightly from the edge of the member and there are two narrow additional flanges at the extreme edges, the narrow gap between these and the side flanges proper forming a groove which receives the edges of the sheets constituting the external layers. The middle layer of aluminium-covered sheet material is secured to the sides of the middle flanges which are central in the frame section.

Those edges of the panels both of the walls and of the ceiling which abut together edge to edge have frame sections which are slightly different from those described above in that the thickness of the web is about  $\frac{1}{4}$  of an inch and it is formed with an undercut or dovetail groove about  $\frac{1}{4}$  of an inch deep and about 1 inch wide. These grooves receive strips of asbestos compound packing which abut together to make a substantially airtight joint. All four sides of the framing of the door are of this section, as well as the bottoms of the wall sections.

The window consists of two panes of glass held in separate channelled frames of aluminium alloy which are screwed to the side flanges of the side frame members of the window panel, the thickness of the external layers of laminated impregnated paper being interposed between these frames and the side flanges, and rectangular apertures of the required size being cut in these layers and in the aluminium-coated sheet constituting the middle layer.

All the panels are secured together by toggle fasteners previously described. One vertical edge of each wall panel carries three hooks, one near the top, one at the middle and one near the bottom, and the other edge carries the lever to which is

pivoted a link or stirrup for engagement with the hook. Each panel also has two levers at its top edge near the ends for engagement with hooks secured to the ends of the ceiling panels. At the vertical corners the hooks are secured to the outer side of the web of the frame member and the levers to the face of the adjacent panel. To assist in assembling the panels with their faces correctly in register dowels and dowel holes may be provided, although these are not strictly necessary as it is an easy matter to place the light and conveniently handle panels in the correct relative position without such aid.

In another embodiment, in which the general arrangement of the panels and their fastenings is as described above, the frame members are made up of two equal channel members of standard cross-section between which the margins of the inner aluminium-coated layer are clamped by means of screws. The external wall layers, which may be of laminated paper impregnated with bakelite or of other suitable sheet material, are fastened to the external flanges by means of screws, these sheets projecting beyond the outer faces of the webs and the packing strips being interposed between these projecting portions and secured to the channels by screws. The panel frames may be spaced, particularly when the external wall layers are not stiff enough to provide rigidity, by diagonally arranged flat strips of metal secured to the flanges of the channel members. In this form of framing the margins of the aluminium-coated sheet material insulate the two channel section members from one another thereby minimising the passage of heat by conduction through the frame members.

Dated this 15th day of September, 1938.

For the Applicants:

GILL, JENNINGS & EVERY,

Chartered Patent Agents,

51/52, Chancery Lane, London, W.C.2.

## COMPLETE SPECIFICATION

### Improvements in and relating to Cubicles or Apartments for use in Houses, Factories, Tents and other places and Temporary Shelters

We, NEWCON INDUSTRIES LIMITED, a Company organised under the laws of Great Britain, and CHARLES HENRY ADAMS, a British Subject, both of City Gate House, 39/45, Finsbury Square, London, E.C.2, and GUY PASCOE CROWDEN, a British Subject, of "Wolstenholme," Stanmore Park, Stanmore, Middlesex, do hereby declare the nature of this invention and in what manner the

same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to cubicles or apartments of the kind having heat insulating walls consisting of three or more layers of comparatively thin material with air spaces between them the surfaces of one or more of which layers are covered with bright metal foil, for example

aluminium foil.

According to the present invention the walls and ceilings of such cubicles are composed of a number of rectangular panels abutting together at their edges and secured together by clips or the like each panel consisting of a frame of metal which in cross-section resembles the letter E with the flanges directed inwards, the sheets of the walls being secured at their edges to these flanges.

The metal strips of E section constituting the framing of the panels may be composed of two strips of channel section placed together, in which case the margins of the middle layer composed for example of thin asbestos or like sheet with aluminium foil secured to both sides by means of bitumen, are placed between the abutting flanges of the two channel section members. In this way the asbestos sheet insulates the two channel sections from one another thereby minimising the transference of heat by conduction through the framing.

The outer sides of the webs of the framing may be formed with dovetail grooves extending longitudinally in which strips of packing material come together and by reason of their resilience they make an air-tight joint between panels. Alternatively, and especially when the framing is composed of two channel section members placed side by side, the strips of packing material may be merely secured to the webs by means of screws or rivets.

Preferably, the external layers constituting the walls are composed of laminations of paper or the like impregnated with artificial resin such as that known under the registered trade mark "Bakelite." Alternatively, they may be of impregnated plywood or fibrous wall-board or other suitable material.

The means for holding the panels together edge to edge preferably consist of toggle devices such as are known as trunk fasteners, consisting of a pivoted lever to which is hinged a link or stirrup which can be engaged with a hook, the base-plate carrying the pivots of the lever being on one panel and the hook being mounted on the other panel so that when the lever is turned down flat with the panel the two are drawn firmly together.

Referring to the accompanying drawings,

Figure 1 is a side elevation in section of a cubicle according to this invention, the section being taken on the line I—I in Figure 2,

Figure 2 is an end elevation in section on the line II—II in Figure 1.

Figure 3 is an elevation of the right-hand end of Figure 1,

Figure 4 is a section on the line IV—IV in Figure 1 of an enlarged scale,

Figure 5 is a section on the line V—V in Figure 2, on an enlarged scale,

Figure 6 is a section on the line VI—VI in Figure 2,

Figures 7, 8 and 9 are detail views in section illustrating another mode of construction, and

Figure 10 is a perspective view showing a preferred form of fastener.

Referring to Figures 1, 2 and 3, the cubicle is rectangular in shape and about 10 feet long, 6 feet wide, and 7 feet high if designed for one occupant, but the dimensions would be greater in the case of cubicles for two or more persons. The side walls are made up of five panels extending the full height of the cubicle and the roof is made up of five panels the same width as the wall panels and extending the full width of the cubicle. The end walls consist of three panels similar to the panels which constitute the side walls. In Figure 1 two of the panels indicated at 12a are hinged at 16 to constitute doors; the panels on the opposite side walls are, however, all alike. An air conditioning apparatus 18 may be placed inside the cubicle at one end. The air conditioning unit used may be one of the well known electrically driven type or it may derive its power from gas or oil. It draws its supply of external air through a pipe 20 extending through an opening provided in the central panel at one end of the cubicle. Alternatively, if it is necessary for the unit to be located outside the cubicle then the conditioned air is blown into the interior through an opening in a side or end panel as desired and by means of a duct passing through a similar orifice a proportion of the internal air may be withdrawn for recirculation through the air conditioning unit. The central panel at the other end of the cubicle is provided with a double window 22. The floor is made up of ten panels 24 of cork surfaced with suitable flooring material such as linoleum 26. These panels are the same width as the panels 12 and in length equal to half the width of the cubicle. Each is surrounded by a metal frame 28. The frame members which are lengthwise of the cubicle are flat strips of metal set on edge, as are the frame members which are situated at the extreme ends of the cubicle. Those members which lie across the width of the cubicle are of the shape shown in Figure 6 and it will be seen that the two frame members shown fitting together are precisely the same shape in cross-section but one of them is upside down in relation to the other, the proportions being such that

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building air*

*Dübel*

when thus fitted together their edges are level with one another as shown. The various sections of the flooring are held in correct register by dowels 30, Figure 6, and the cork is held in place in the frame by means of pins 32.

All the wall and roof panels consist of frames made up of metal members 34 of a section resembling the letter E. They are extruded from a light aluminium alloy. As clearly shown in Figures 4 and 5 the middle flange 36 is wider than the other two 38, and is so placed that one of its sides is in the centre of the width of the member. The side flanges 38 are set slightly from the edge of the member and there are two narrow additional flanges 40 at the extreme edges, a narrow gap between these and the side flanges 38 forming a groove which receives the edges of the sheets 43 constituting the external layers of the walls. The middle layer 44 of sheet material covered with aluminium foil is secured to the sides of the flanges 36 which are central in the frame section.

Those edges of the panels both of the walls and of the ceiling which abut together end to end have frame sections shown in Figure 4 which provide an undercut or dovetail groove 46 about  $\frac{3}{8}$  inch deep and 1 inch wide. These grooves receive strips 48 of asbestos compound packing which abut together to make a substantial airtight joint. All four sides of the framing of the doors 12 are of this section, as well as the bottoms of the wall sections as shown in Figure 5.

The layers 42 of the wall and roof panels are composed of laminations of paper or the like impregnated with artificial resin such as that known under the registered trade mark "Bakelite." Instead of this material they may be of plywood impregnated with artificial resin or of sheet material having an asbestos basis. These layers and also the layers 44 are secured to the flanges by means of screws as clearly shown.

The layer 42 which is on the inside of each of the wall panels is formed with a rectangular opening 50 near the bottom and these openings are covered with mosquito-proof netting as shown. These openings allow the air drawn or blown into the cubicle by the air conditioning apparatus 18 to pass into the air space between the inner layer 42 and the intermediate layer 44. The air passes up through this space and through a slot 52 which is in register with a number of apertures 54 in the lower layer 42 of the roof panels. The air passes through these openings into the lower air space of the roof panels and through central openings 56, 58 in the intermediate

layers 44 and the outer layers 42 respectively of the roof panels. These openings 56, 58 are covered with mosquito-proof netting. Owing to the circulation of air through the inner air spaces of the walls and ceiling the inner layers 42 are maintained at approximately the same temperature as the air within the cubicle. Thus, radiation of heat from the walls to persons inside the cubicle, or from such persons to the walls, is minimised and it has been found that the virtual absence of excessive radiation is an important factor in maintaining comfortable conditions within the cubicle.

As shown best in Figure 3, the various panels are held together by toggle clips 60 shown in perspective in Figure 10 which are similar to trunk fasteners and are so well known as to need no detailed description. Three of these are employed at vertical meeting edges and two at the meeting edges between roof and wall panels.

As shown in Figure 5, strips of metal 53 are welded along the inner edges of the upper frame members of the wall panels. These strips are the same thickness as the flanges 40 of the roof frame members and they serve to close the gap which would otherwise be caused by the fact that the flanges 40 project beyond the surface of the outer layers 42.

Figures 7, 8 and 9 illustrate an alternative construction in which the frame members are composed of two channel section members 70 placed with their flanges together as shown with the intermediate layer 44 clamped between the flanges, thereby serving to minimise the passage of heat from one channel member to the other. The external layers 42, here shown as sheets of fibrous wall-board, project slightly beyond the outer faces of the webs of the members 70 and packing strips 72 are interposed between the projecting parts of these layers, being secured to the webs by means of screws 74.

Figures 7 and 8 illustrate one way of securing the layers 42 to the frame members, and the frame members to one another. In this method screws 76 pass through bushes 78 of heat insulating material in one of the channel section members and into tapped holes 80 in the inner flange of the other member. These screws secure one outer layer and also secure the two members 70 together. From the outer side screws 82 enter tapped holes 84 in the outer flange of the member 70 and their extremities are located in insulating bushes 85 located in holes in the meeting flanges of the members 70. Figure 9 represents an alternative construction in which bolts 86 and nuts 88 are

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employed in place of the screws 76, the insulating bushes 85 of Figure 8 being employed, while screws 90 entering tapped holes 92 in the outer flange of the other channel member serve to secure the other outer layer 42.

If desired, the inner surfaces of the outer layers 42 may be covered with bright aluminium foil.

If desired the layers 42 of the wall and roof panels may be composed of materials which are fire-proof or fire resisting and proof against termites.

In the specification of Letters Patent No. 492,182 there is claimed the combination with air conditioning apparatus of a cubicle the walls and ceiling of which consist of three or more layers with air spaces between them the surfaces of one or more of which layers are covered with bright metal foil, for example aluminium foil, and provided with openings whereby the conditioned air supplied to the interior of the cubicle circulates through at least the inner one of the air spaces before escaping into the atmosphere, the walls being composed of panels the frame members of which are of metal resembling the letter E in cross-section.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A cubicle or apartment of the kind hereinbefore referred to the walls and ceiling of which are composed of a number of rectangular panels abutting together at their edges and secured together by clips or the like, each panel consisting of a frame of metal which in cross-section resembles the letter E with the flanges directed inwards, the sheets of the walls being secured at their edges to these flanges.

2. A cubicle or apartment according to Claim 1 wherein the frames are composed of two strips of channel section placed together, the middle wall layer being placed between the flanges of the two channel section members which abut together.

3. A cubicle or apartment according to Claim 1 or Claim 2 wherein the outer sides of the webs of the frame members which are to abut together edge to edge are provided with strips of packing material for the purpose described.

4. A cubicle or apartment according to Claim 3 wherein the webs of the frame members which are to abut together edge to edge are formed with dovetail grooves extending longitudinally for the reception of the strips of packing material.

5. A cubicle or apartment according to any preceding claim wherein the means for holding the panels together consist of toggle devices each comprising a pivoted lever to which is hinged a link or stirrup which can be engaged with a hook, the base-plate carrying the pivots of the lever being on one panel and the hook being mounted on the other panel.

6. A cubicle or apartment according to Claim 1 wherein the E section frame members are of light aluminium alloy, the middle flange being wider than the other two and so placed that one of its sides is in the centre of the width of the member.

7. A cubicle or apartment according to Claim 6 wherein the side flanges are set in slightly from the edge of the member and there are two narrow additional flanges at the extreme edges whereby a groove is provided between the additional flanges and the side flanges proper for the reception of the edges of the sheets constituting the external wall layers.

8. A cubicle or apartment according to any preceding claim wherein the outer layer of each wall panel which is presented inwardly is formed with an opening near the bottom, preferably covered with mosquito-proof gauze, and the frame member at the top of each wall panel is formed with an opening through which air passing upwards through the inner one of the two air spaces can enter one of the air spaces in the roof panels through openings in the lower sides of said panels registering with the aforesaid openings in the upper frame members of the wall panels.

9. A cubicle or apartment according to any preceding claim wherein the floor is composed of panels of cork or like insulating material surrounded by marginal metal frames which interlock with one another.

10. A cubicle or apartment according to any preceding claim wherein the panel members are of sheet material which is fireproof or fire-resisting.

11. A cubicle or apartment according to any preceding claim wherein the panel members are of sheet material which is proof against termites.

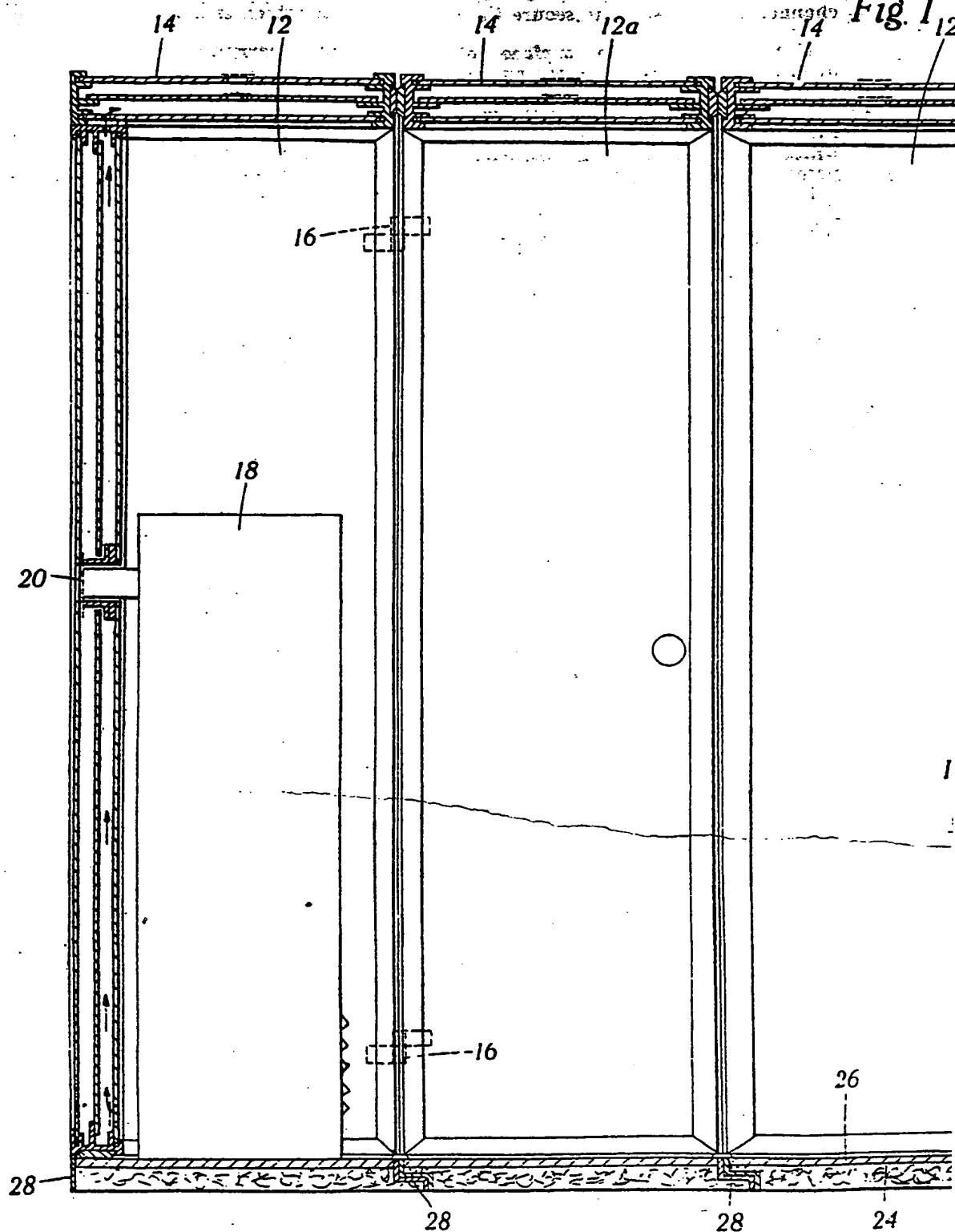
12. The improved cubicle or apartment substantially as described with reference to Figures 1 to 6 and 10 or to Figures 7, 8, 9 and 10 of the accompanying drawings.

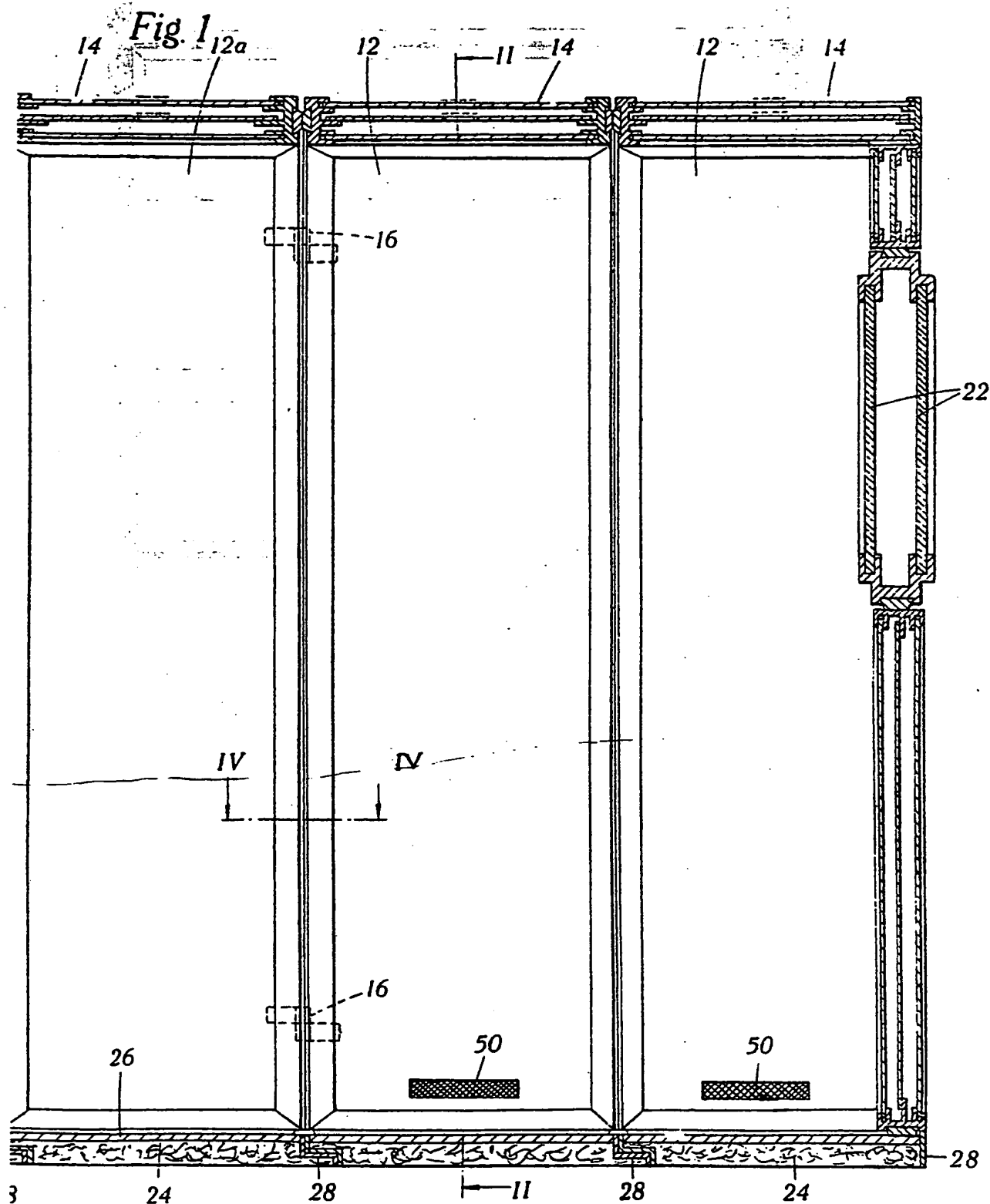
Dated this 4th day of November, 1938.

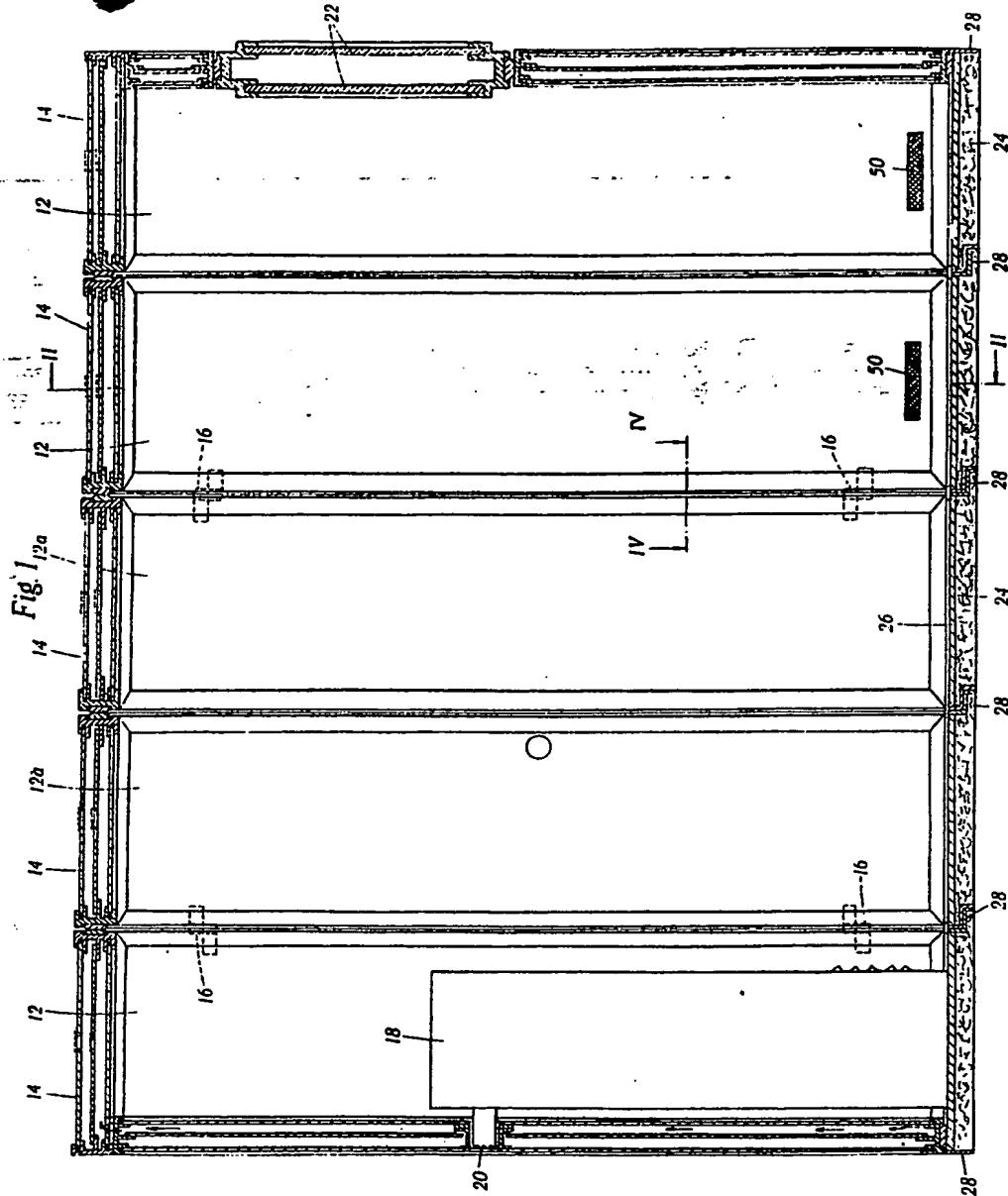
For the Applicants,  
GILL, JENNINGS & EVERY,  
Chartered Patent Agents,  
51/52, Chancery Lane, London, W.C.2.

Fig. 1

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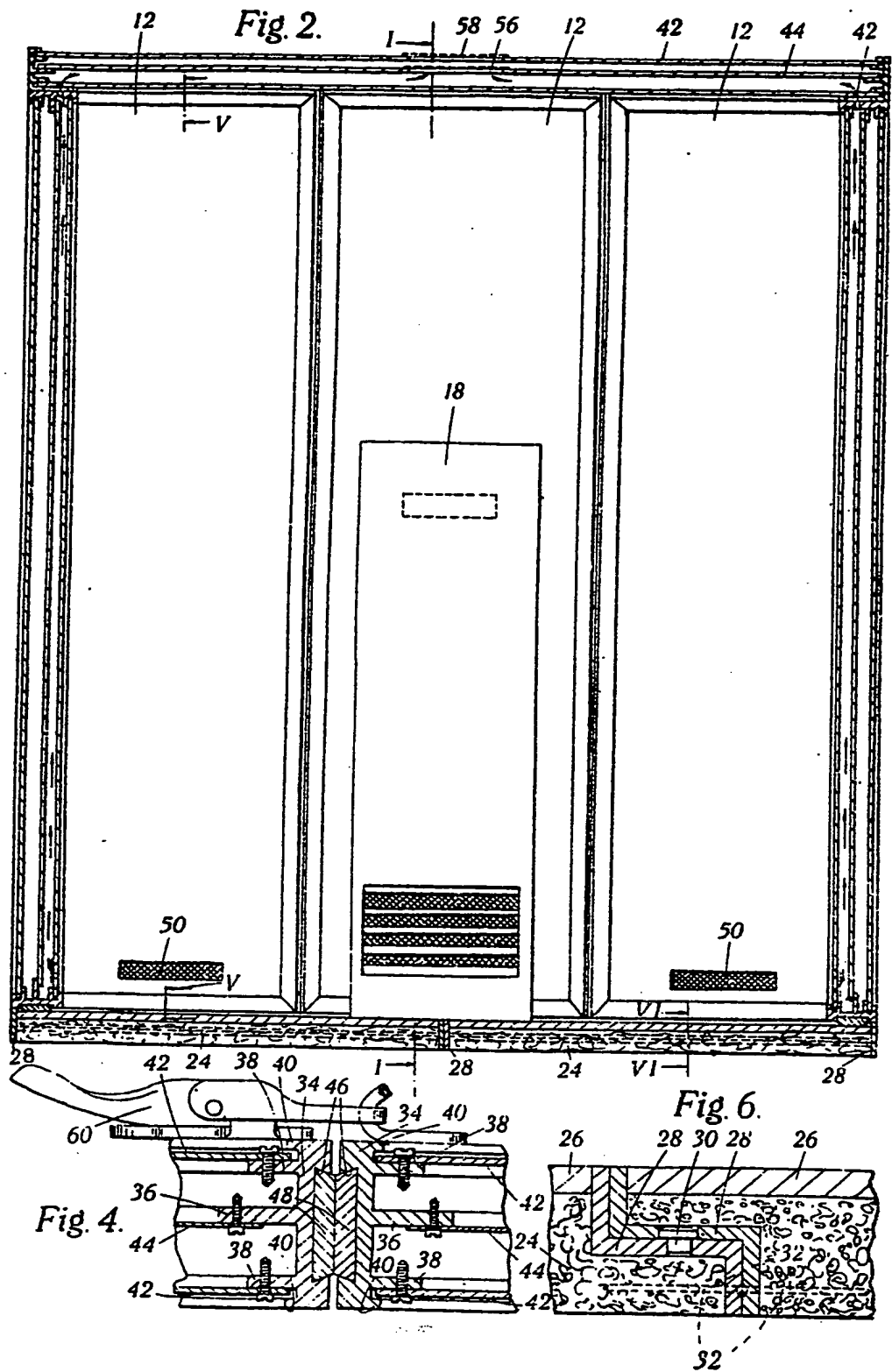




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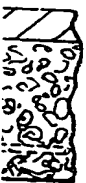
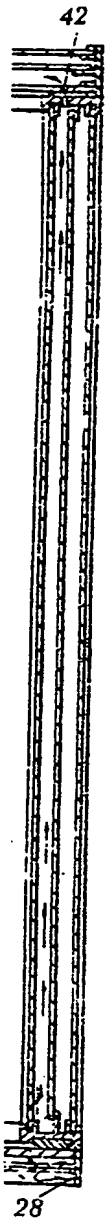
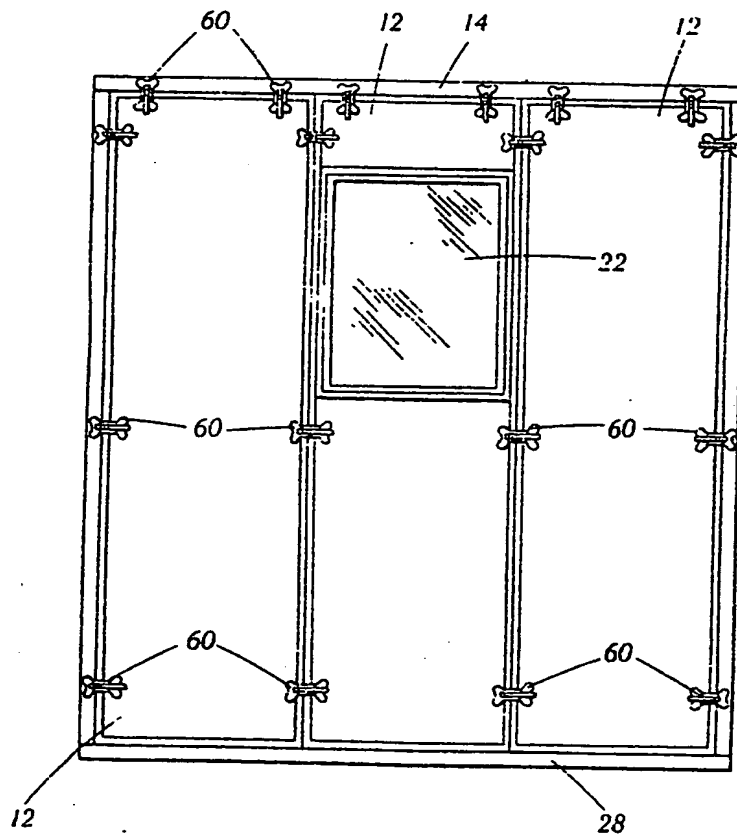


Fig. 3.



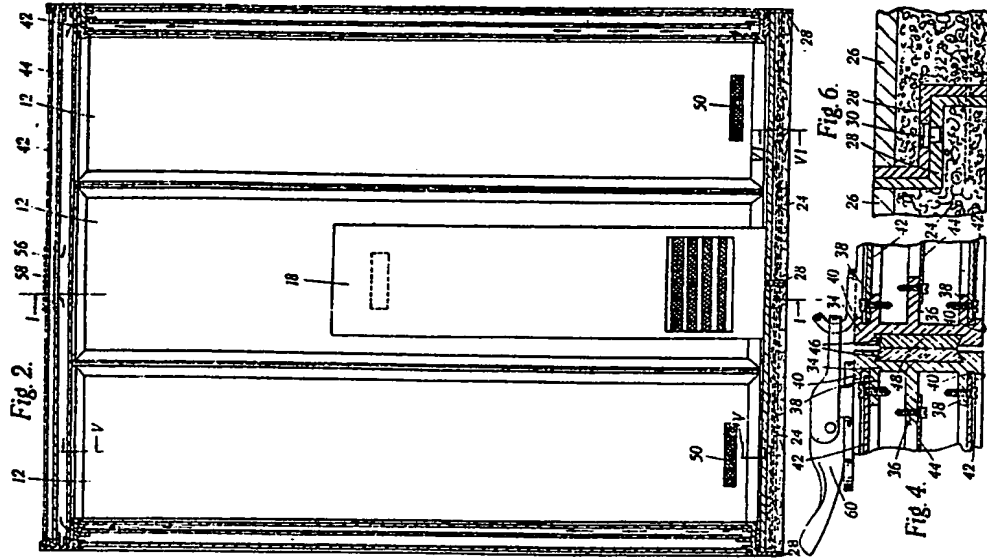


Fig. 2.

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Fig. 3.

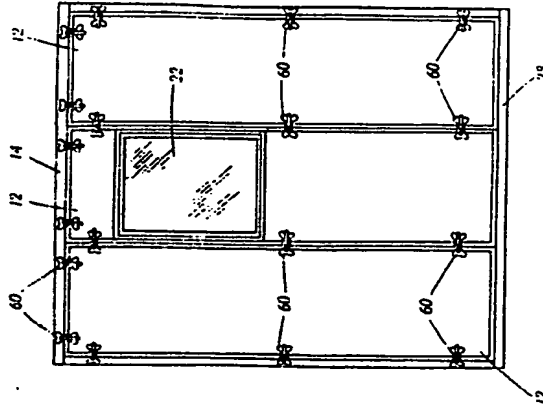


Fig. 4.

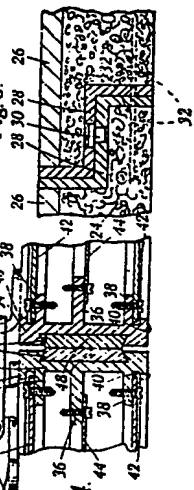


Fig. 5.

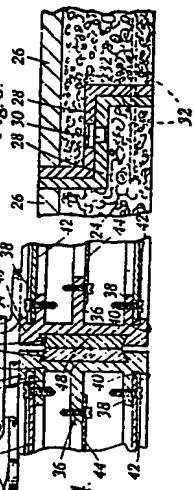


Fig. 5.

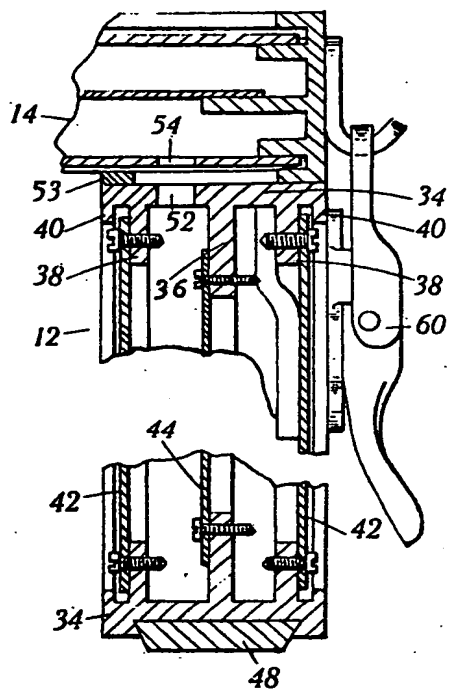


Fig. 7.

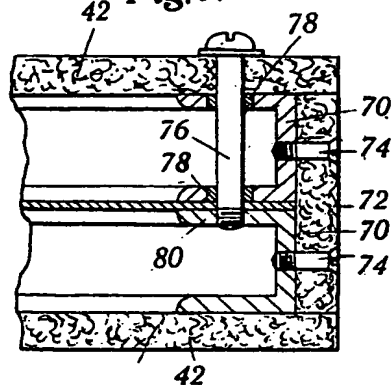


Fig. 8.

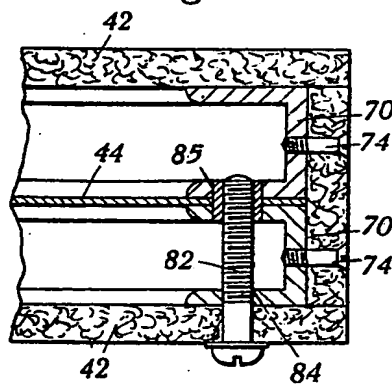


Fig. 9.

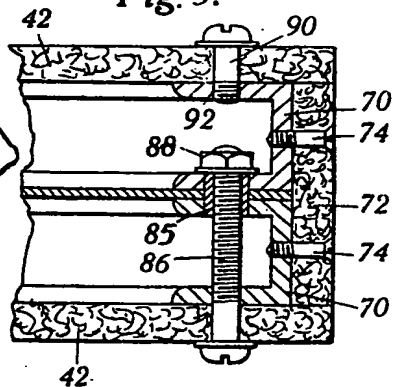
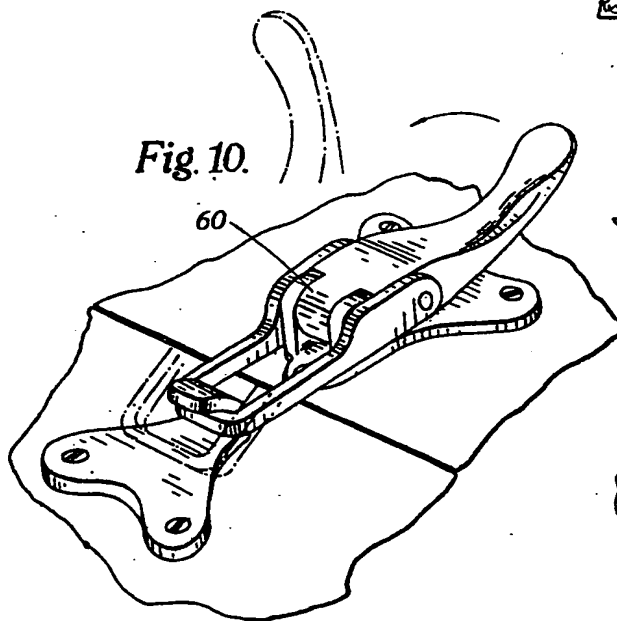


Fig. 10.



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